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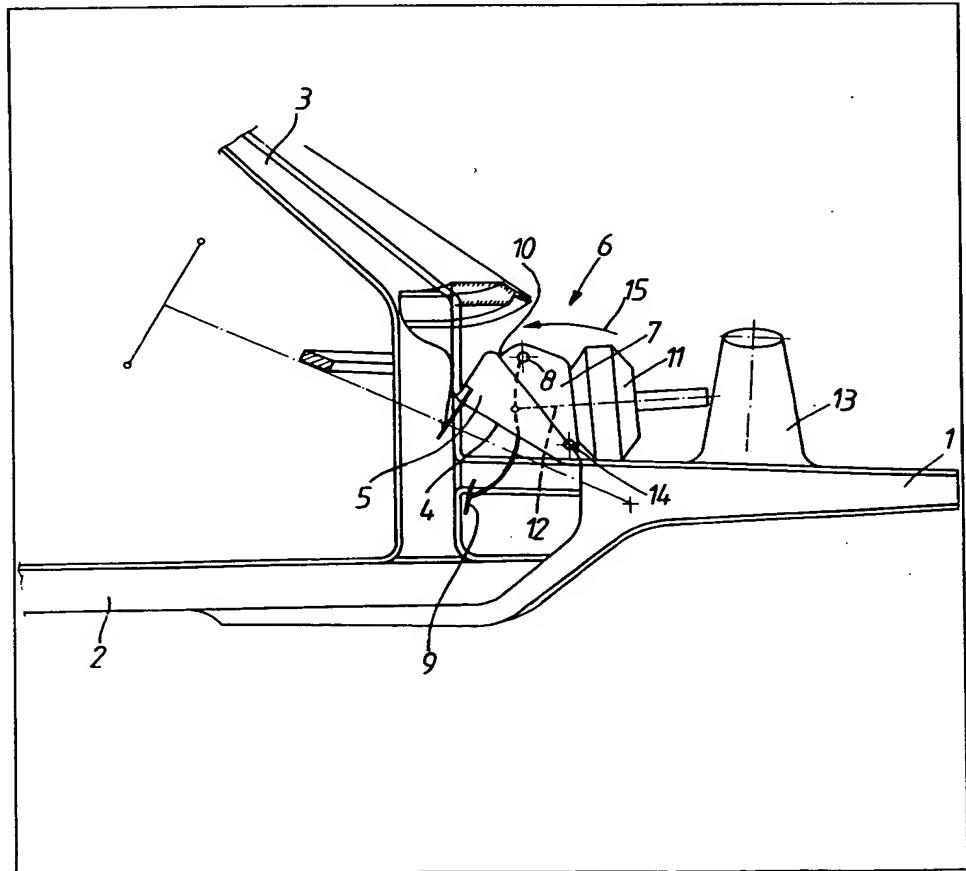
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(54) A motor vehicle

(57) In a motor vehicle having a front mounted engine or luggage compartment and a transverse front wall 4 located between the compartment and the passenger compartment, a brake unit 11 is mounted outside the passenger compartment and a pendant brake pedal 9 extends through the wall 4 from the brake unit 11 into the passenger compartment.

The brake pedal is pivotally mounted by means of a shaft 8 located in the upper part of an upper pan 7 of a two stage impact pan 6 which consists of the upper pan 7 and a larger deformable lower pan 5 connected to the front wall 4.

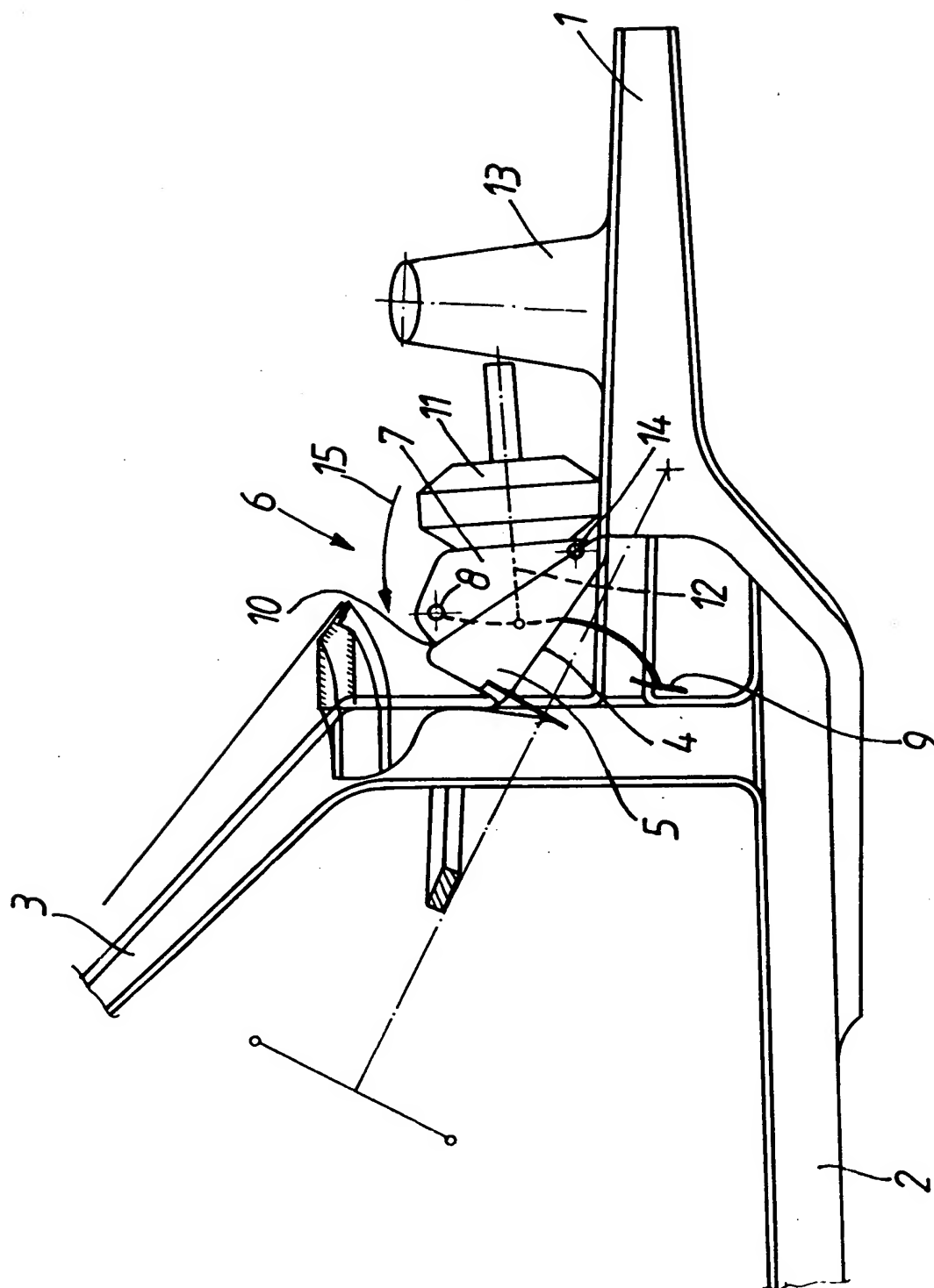
The lower pan 5 is designed to deform, in the event of a collision, a greater amount at its upper section than its lower section so that the brake unit 11 can perform a swivelling motion whereby the brake pedal is moved away from the driver.



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## SPECIFICATION

## A motor vehicle

- 5 The invention relates to a passenger motor vehicle having a front-mounted engine compartment or luggage boot and a front wall which is located between the said engine compartment or luggage boot and the passenger compartment and through which extends a pendant brake pedal connected to a  
10 brake unit mounted outside the passenger compartment, the brake unit being mounted in such a way that, in the event of the front part of the vehicle being deformed due to collision, the unit performs a  
15 swivelling movement whereby the brake pedal is moved away from the driver.

- An arrangement of this type is known from German Offenlegungsschrift 28 41 988, GB published specification No 20 31 814 (7932790). It was  
20 developed because it had been discovered through the practical analysis of road traffic accidents that the direct, so-called 0°, head-on collision occurs relatively rarely. In impact accidents of this form in which the entire front part of a vehicle is subjected to  
25 a uniform impact, only a relatively slight deformation of the front part in relation to the speed of impact, actually takes place. By contrast, impact accidents involving one-side impact on the side or front corner of a vehicle facing oncoming traffic  
30 occur in practice with significantly greater frequency, without the drive unit, ie, the engine and transmission, being subjected to the impact. In these cases, therefore, a significantly greater deformation of the impacted part of the vehicle takes place. Since  
35 the pedal arrangement, in particular the brake pedal, and the brake unit and main brake cylinder are mounted on the side of the vehicle which is exposed to the impact in an accident, units of this type should not be non-deformably mounted, but it should be  
40 made possible for these parts to be deflected in the event of deformation of the front part of the vehicle. Moreover, the pedals should be moved away from the driver in the event of an accident so that injuries due to rebounding and dislocation of the joints may  
45 be avoided.

- These requirements are partly met by the known arrangement, which however, has the disadvantage that in the event of an accident it can assist, at best, very little in the absorption of the kinetic energy of  
50 the relatively heavy brake unit and component parts connected thereto.

- The object underlying the present invention was therefore to develop a motor vehicle of the type described in the introduction in such a way that a  
55 substantial contribution is made to the absorption of energy while maintaining the kinematic conditions.

- According to the present invention there is provided a passenger motor vehicle having a front-mounted engine compartment or luggage boot and  
60 a front wall which is located between the said engine compartment or luggage boot and the passenger compartment and through which front wall extends a pendant brake pedal connected to a brake unit mounted outside the passenger compartment,  
65 where in the brake unit is attached to a rigid upper

pan of a two-stage impact pan the brake pedal being pivotally mounted by means of a pedal shaft mounted in the upper section of the upper pan and the upper pan leading, via a step to a larger  
70 deformable lower pan which is connected to the front wall, the lower pan being such that for a given impact, a greater degree of deformation is provided in its upper section than in its lower section so that in the event of the front part of the vehicle being  
75 deformed due to an accident, the brake unit performs a swivelling movement whereby the brake pedal is moved away from the driver.

- In a preferred embodiment of the invention the lower pan is formed out of the front wall of the  
80 vehicle.

The upper pan and lower pan can in this case be connected so as to be easily detachable, for example by being screwed together, or to be inseparable, for example by being welded together.

- 85 To ensure a controlled sequence of movements during deformation, it is advantageous if the lower pan - when seen in side view - is of triangular form and arranged in such a way that its corner or angle which is formed by the two longer sides of the  
90 triangle points generally downwards.

- The invention will now be described in more detail by way of example, with reference to the accompanying drawing which shows a side view of part of the body shell structure of the front part of a  
95 passenger car.

- The part of the body shell of a passenger car shown in the drawing comprises forward side members 1, which lead rearward into side sills 2, the so-called door sills, and a front column 3 also known  
100 as an A-column). Extending from and forward out of a front wall 4 is a deformable lower pan 5 of a two-stage impact pan 6 on which a smaller rigid upper pan 7 is mounted, the upper section of this upper pan accommodating a pedal shaft 8 for a  
105 pivotally mounted pendant brake pedal 9. The area between the lower pan 5 and upper pan 7 is connected by way of a step 10 whereby, in the event of an accident, deformation of the lower pan 5 is initiated in a manner which is known with impact  
110 pans.

A brake unit 11, which also contains the main brake cylinder and which is connected to the brake pedal 9 via a linkage or pushrod 12, is attached to the upper pan 7.

- 115 If, in the event of deformation of the front part of the vehicle in an accident, the brake unit 11 is subjected to an impact, for example by the dome 13 which serves to accommodate a shock-absorbing leg (not shown) or the like, the rigid upper pan 7 dips  
120 into the deforming lower pan 5. Since the degree of deformation with which the lower pan 5 is provided for this purpose is provided mainly in its upper section, the brake unit 11 is pivoted substantially about an imaginary lateral axis 14 in the direction of  
125 the arrow 15, while absorbing energy.

- Since the brake unit 11 is connected via the linkage 12 to the brake pedal 9, the latter is swung away from the driver, and as far as the front wall 4, during this action and forward in the direction of the front  
130 wall 4, thus reducing the danger to the driver.

## CLAIMS

1. A passenger motor vehicle having a front mounted engine compartment or luggage boot and  
5 a front wall which is located between the said engine compartment or luggage boot and the passenger compartment and through which front wall extends a pendant brake pedal connected to a brake unit mounted outside the passenger compartment,  
10 wherein the brake unit is attached to a rigid upper pan of a two-stage impact pan, the brake pedal being pivotally mounted by means of a pedal shaft mounted in the upper section of the upper pan and the upper pan leading, via a step to a larger  
15 deformable lower pan which is connected to the front wall the lower pan being such that for a given impact, a greater degree of deformation is provided in its upper section than in its lower section so that in the event of the front part of the vehicle being  
20 deformed due to an accident, the brake unit performs a swivelling movement whereby the brake pedal is moved away from the driver.
2. A motor vehicle according to claim 1, wherein the lower pan is formed out of the front wall.
- 25 3. A motor vehicle according to claim 1 or 2, wherein the upper pan and lower pan of the impact pan are detachably connected.
4. A motor vehicle according to claim 3 wherein the upper pan and lower pan are detachably connected by means of screw-threaded devices.
- 30 5. A motor vehicle according to claim 1, or 2 wherein the upper pan and lower pan of the impact pan are inseparably connected, for example by being welded together.
- 35 6. A motor vehicle according to claim 5 wherein the upper pan and lower pan are welded together.
7. A motor vehicle according to any one of claims 1 to 6 wherein the lower pan - when seen in side view - is of triangular form and arranged in such  
40 a way that its corner or angle which is formed by the two longer sides of the triangle points generally downwards.
8. A passenger motor vehicle substantially as described herein with reference to and as illustrated  
45 in the accompanying drawing.